

*Amendment and Response*

*Serial No. 10/008,392*

*Confirmation No. 3013*

*System and Method Using Thermal Image Analysis for Polygraph Testing*

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14

**Remarks**

The Office Action mailed December 31, 2003 has been received and reviewed. Claims 1, 8-12, 19-23, 28-30, 34, 36, and 40 have been amended. Claims 41-59 have been added. Therefore, claim 1-59 are pending in the present application. Reconsideration and withdrawal of the rejections are respectfully requested in view of the amendments and remarks presented herein.

**Information Disclosure Statement**

Applicant filed the attached Supplemental Information Disclosure Statement (Exhibit A) and 1449 form (Exhibit B), with copies of the documents listed on the 1449, on August 26, 2003. A copy of the date-stamped return receipt postcard indicating that the Patent Office received the Supplemental Information Disclosure Statement on August 29, 2003, is also enclosed and marked as Exhibit C. Applicants have not yet received an initialed copy of the 1449 form in return. Pursuant to the provisions of MPEP §609, Applicant requests that a copy of the 1449 form, marked as being considered and initialed by the Examiner, be returned with the next official action.

**Specification**

The Examiner objected to the amendment filed October 6, 2003 indicating that it introduces new matter into the disclosure. Applicant respectfully traverses such an objection. It is noted that the language "calculating" as used in the amendment filed October 6, 2003 was language discussed with the Examiner in an Interview held 4 June 2003 and which is summarized in the amendment filed October 6, 2003. The language "calculating" change in blood flow rate is clearly supported in the detailed description of the invention, for example, at pages 24-27. For example, in one embodiment of the present invention, such a calculation is supported by the equation at page 26, lines 12-15, which provides a time derivative of blood flow rate (e.g., acceleration of the rate or change of the rate over time or over a plurality of frames).

*Amendment and Response*  
Serial No. 10/008,392  
Confirmation No. 3013  
System and Method Using Thermal Image Analysis for Polygraph Testing

---

15

Applicant has amended claims 1, 12, 23, 30, and 36 to include language that clarifies the calculation term. In other words, it is presented that the change of blood flow rate is determined over a plurality of frames (i.e., over time). Such amendments are only intended to clarify the claim, however, the scope of the claim is intended to be substantially the same after the amendment as it was before the amendment (e.g., change of blood flow rate already refers to a measurement over time). Many of the other claims have been amended to maintain proper antecedent basis.

Further, as noted in the Amendment filed 6 October 2003, the claims have been amended with the calculation language to clearly distinguish the present claimed invention from the Anbar reference even though it is believed that the previous claims provided such distinguishing characteristics. As recognized by the Examiner in the "Response to Arguments" section of the present Office Action, the previous Anbar rejections have been overcome. However, it should be noted that such claim amendments are made with respect to Anbar only and not with respect to any other art cited or uncited. As such, the pending claims are to be interpreted as broadly as possible to encompass all equivalents thereto without being interpreted to read on Anbar.

### **Claim Objections**

The Examiner objected to claims 9, 10, 11, 20, 21, 28 and 29 because of informalities. Specifically, the Examiner alleges that the use of "one or more" in the language of these claims makes the claim language confusing because it is unclear whether Applicant intends to claim --at least one-- or --a plurality of--.

Applicant respectfully traverses the Examiner's objection. The term "at least one" and "one or more" have the same meaning. For example, the term refers to either singular or plural items. However, as use of "at least one" does not narrow the scope of the claims, this language suggested by the Examiner has been used to replace "one or more."

*Amendment and Response*  
Serial No. 10/008,392  
Confirmation No. 3013  
System and Method Using Thermal Image Analysis for Polygraph Testing

16

### **The 35 U.S.C. §103 Rejection**

The Examiner rejected claims 1, 2, 4-13, 15-23, 25-30, 32-36 and 38-40 under 35 U.S.C. §103(a) as being unpatentable over Anbar in view of Stirbl et al. (U.S. Patent No. 5,507,291, hereinafter Stirbl) and Zucker et al. (U.S. Patent No. 5,603,328, hereinafter Zucker). Applicant respectfully traverses the rejection of such claims.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. See M.P.E.P. § 2143.

Anbar does not describe transformation of thermal image data to change of blood flow rate data over a plurality of the frames based on the thermal image data, as described in each of the amended independent claims 1, 12, 23, 30, and 36. For example, such calculated change of blood flow rate according to the present invention is described, in one embodiment, in the specification at pages 24-27. Such a transformation of thermal image data to change of blood flow rate is not described in Anbar, nor would such a transformation be performed, during normal operation in Anbar.

Anbar uses a thermal imaging system. However, Anbar does not transform thermal image data to change of blood flow rate. Anbar simply determines a thermal quantity referred to as "HST." HST is defined as the average temperature divided by the standard deviation of the average temperature; a dimensionless parameter. In Anbar, it is indicated that "to a much lesser extent" HST is "affected "by the blood flow in subcutaneous vessels." In other words, Anbar assumes that the quantity HST is correlated indirectly with blood perfusion. However, there is no transformation of thermal image data to change of blood flow rate as described in the pending claims (e.g., a heat transfer equation that allows one to compute blood flow rate values out of thermal values). Anbar does not compute blood flow rate values, but rather Anbar uses derivative thermal values (i.e., HST) that are assumed to be, at least in part, the result of

*Amendment and Response*

*Serial No. 10/008,392*

*Confirmation No. 3013*

*System and Method Using Thermal Image Analysis for Polygraph Testing*

---

17

quantitatively unspecified blood flow changes. In other words, rather, HST values are determined by Anbar that are assumed to be, at least in part, the result of quantitatively unspecified blood flow changes. This determination of HST values is not a determination or transformation of thermal data to change in blood flow rate, but rather a determination of a dimensionless value that is defined as the average temperature divided by the standard deviation of the average temperature. There is no calculation of change of blood flow rate.

The Examiner appears to recognize that Anbar does not describe such transformation. However, the Examiner relies on Stirbl to teach "that it is well known in the art to combine in a system for use in detecting deception, non-invasive measurement means, as a video camera and a microphone, and invasive means, such as a device in contact with or inserted into a patient to determine blood flow rate." Further, the Examiner relies on Zucker to teach "that it is well known in the art that thermal image data from an area of a subject can be transformed into rate of blood flow data" and that "an image processor coupled to the thermal imager can be employed to calculate a rate of blood flow in a graft." The Examiner goes on to recite that "it would have been obvious . . . to modify the computing apparatus of the system disclosed by Anbar to be operable to calculate from the thermal imaging data a change of blood flow rate in addition to the parameters determined by the computing apparatus of the system of Anbar, as Stirbl teaches that blood flow rate is among the parameters monitored by a lie detector apparatus and Zucker teaches that the blood flow rate can be calculated from a thermal image of the subject."

Stirbl and Zucker do not cure the deficiencies so apparent in Anbar. The Examiner points to no section of Stirbl or Zucker which describes transforming thermal image data to change of blood flow rate as described in the amended claims (e.g., calculating change of blood flow rate over a plurality of frames based on the thermal image data).

For example, Stirbl describes invasive or contact type blood flow rate measurements at column 3, lines 25-41 as recognized by the Examiner. There is no transformation of thermal image data to "change of blood flow rate" over a plurality of frames (i.e., the acceleration of blood flow rate).

*Amendment and Response*

*Serial No. 10/008,392*

*Confirmation No. 3013*

*System and Method Using Thermal Image Analysis for Polygraph Testing*

---

18

Zucker also does not describe such transformation of thermal image data. First, the Examiner points to no section of Zucker which describes transformation into blood flow rate data. In fact, only a generalization of such transformation is alleged by the Examiner. Clearly, Zucker does not describe the transformation recited in the amended claims (e.g., calculating change of blood flow rate over a plurality of frames).

For example, Zucker appears to measure flow rate (as described in column 18, line 55-67) of a saline solution injected into a graft by sampling, over predetermined time intervals, the position of the tail portion of the solution and its displacement within that time interval (e.g., a procedure which may then be repeated for accuracy). There is no transformation of thermal image data to change of blood flow rate (e.g., blood flow rate change over a plurality of frames). Zucker merely determines a rate of flow for the saline. If the Examiner disagrees, it is requested that the specific portion of Zucker that shows such a transformation be cited to the Applicant.

For at least the above reasons, the independent claims 1, 12, 23, 30, and 36 are not obvious in view of the cited references (e.g., all the claim limitations are not described therein). Further, each of the dependent claims respectively depend on one of the independent claims, either directly or indirectly. Therefore, they include the limitations of the respective independent claim upon which they depend. As such, for the same reasons provided above with respect to the independent claims, and by reason of their own limitations, such dependent claims are not obvious in view of the cited references.

#### **Allowable Subject Matter**

Applicant further acknowledges that claims 3, 14, 24, 31, and 37 are objected to as being dependent upon a non-elected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants have provided new claims 41-59 which include independent claims that correspond to the claims objected to by the Examiner. For example, claim 41 corresponds to claim 3, claim 45 corresponds to claim 14, claim 49 corresponds to claim 24, claim 51 corresponds to claim 31, and claim 56 corresponds to claim 37. As such, these independent claims are believed to be in

*Amendment and Response*

*Serial No. 10/008,392*

*Confirmation No. 3013*

*System and Method Using Thermal Image Analysis for Polygraph Testing*

---

19

allowable condition, as well as the new dependent claims which depend thereon. It is noted that these new claims are based on the objected to claims pending at the time the Office Action of 14 November 2002 was mailed by the Examiner and not the current objected to claims.

**Summary**

It is respectfully submitted that the pending claims are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicant's Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted for  
**PAVLIDIS**

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29 April 2004

Date

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**CERTIFICATE UNDER 37 CFR §1.8:**

The undersigned hereby certifies that the Transmittal Letter and the paper(s), as described hereinabove, are being transmitted by facsimile in accordance with 37 CFR §1.6(d) to the Patent and Trademark Office, addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 29<sup>th</sup> day of APRIL, 2004, at 1:40 pm (Central Time).

By: Sandy Truehart  
Name: Sandy Truehart

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